



[4910-13]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. FAA-2015-5877; Special Conditions No. 25-610-SC]

Special Conditions: The Boeing Company, Model 737-8 airplanes; Design Roll-Maneuver Requirements.

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions; request for comments.

SUMMARY: These special conditions are issued for Boeing Model 737-8 airplanes. These airplanes will have a novel or unusual design feature associated with an electronic flight-control system that provides roll control of the airplane through pilot inputs to the flight computers. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for this design feature. These special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

DATES: This action is effective on the Boeing Company on **[INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. We must receive your comments by **[INSERT DATE 45 DAYS AFTER PUBLICATION IN THE FEDERAL REGISTER]**.

ADDRESSES: Send comments identified by docket no. FAA-2015-5877 using any of the following methods:

- *Federal eRegulations Portal:* Go to <http://www.regulations.gov/> and follow the online instructions for sending your comments electronically.
- *Mail:* Send comments to Docket Operations, M-30, U.S. Department of Transportation (DOT), 1200 New Jersey Avenue, SE., Room W12-140, West Building Ground Floor, Washington, DC, 20590-0001.
- *Hand Delivery or Courier:* Take comments to Docket Operations in Room W12-140 of the West Building Ground Floor at 1200 New Jersey Avenue, SE., Washington, DC, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.
- *Fax:* Fax comments to Docket Operations at 202-493-2251.

Privacy: The FAA will post all comments it receives, without change, to <http://www.regulations.gov/>, including any personal information the commenter provides. Using the search function of the docket Web site, anyone can find and read the electronic form of all comments received into any FAA docket, including the name of the individual sending the comment (or signing the comment for an association, business, labor union, etc.). DOT's complete Privacy Act Statement can be found in the Federal Register published on April 11, 2000 (65 FR 19477-19478), as well as at <http://DocketsInfo.dot.gov/>.

Docket: Background documents or comments received may be read at <http://www.regulations.gov/> at any time. Follow the online instructions for accessing the docket, or go to Docket Operations in Room W12-140 of the West Building Ground Floor at 1200 New Jersey Avenue, SE., Washington, DC, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

FOR FURTHER INFORMATION CONTACT: Mark Freisthler, FAA, Airframe and Cabin Safety Branch, Transport Airplane Directorate, Aircraft Certification Service, 1601 Lind Avenue SW., Renton, Washington, 98057-3356; telephone 425-227-1119; facsimile 425-227-1232.

SUPPLEMENTARY INFORMATION: The FAA has determined that notice of, and opportunity for prior public comment on, these special conditions is impracticable because these procedures would significantly delay issuance of the design approval and thus delivery of the affected airplane.

In addition, the substance of these special conditions has been subject to the public comment process in several prior instances with no substantive comments received. The FAA therefore finds that good cause exists for making these special conditions effective upon publication in the **Federal Register**.

Comments Invited

We invite interested people to take part in this rulemaking by sending written comments, data, or views. The most helpful comments reference a specific portion of the special conditions, explain the reason for any recommended change, and include supporting data.

We will consider all comments we receive by the closing date for comments. We may change these special conditions based on the comments we receive.

Background

On January 27, 2012, The Boeing Company applied for an amendment to Type Certificate No. A16WE to include a new Model 737-8 airplane. The Model 737-8 airplane is a narrow-body, transport-category airplane that is a derivative of the Model 737-800 airplane with two CFM LEAP-1B wing-mounted engines.

The Model 737-8 airplane will include electronic flight controls that affect maneuvering.

The current design roll-maneuver requirements in Title 14, Code of Federal Regulations (14 CFR) part 25 are inadequate for addressing an airplane with electronic flight controls that affect maneuvering. These special conditions adjust the current roll-maneuver requirement, § 25.349, to take into account the effects of an electronic flight-control system.

Type Certification Basis

Under the provisions of § 21.101, The Boeing Company must show that the Model 737-8 series airplanes meet the applicable provisions of the regulations listed in type certificate no. A16WE, or the applicable regulations in effect on the date of application for the change except for earlier amendments as agreed upon by the FAA.

The regulations listed in the type certificate are commonly referred to as the “original type-certification basis.” The regulations listed in type certificate no. A16WE are as follows:

14 CFR part 25, effective February 1, 1965, including Amendments 25-1 through 25-134. In addition, the certification basis includes certain special conditions, exemptions, or later amended sections of the applicable part that are not relevant to these special conditions.

If the Administrator finds that the applicable airworthiness regulations (i.e., 14 CFR part 25) do not contain adequate or appropriate safety standards for the Model 737-8 series airplanes because of a novel or unusual design feature, special conditions are prescribed under the provisions of § 21.16.

Special conditions are initially applicable to the model for which they are issued. Should the type certificate for that model be amended later to include any other model that incorporates the same novel or unusual design feature, or should any other model already included on the

same type certificate be modified to incorporate the same novel or unusual design feature, these special conditions would also apply to the other model under § 21.101.

In addition to the applicable airworthiness regulations and special conditions, the Model 737-8 series airplanes must comply with the fuel-vent and exhaust-emission requirements of 14 CFR part 34, and the noise-certification requirements of 14 CFR part 36.

The FAA issues special conditions, as defined in 14 CFR 11.19, in accordance with § 11.38, and they become part of the type-certification basis under § 21.101.

Novel or Unusual Design Features

The Model 737-8 series airplanes will incorporate the following novel or unusual design features:

The airplanes are equipped with an electronic flight-control system that provides control through pilot inputs to the flight computer. Current part 25 airworthiness regulations account for control laws for which aileron deflection is proportional to control-stick deflection. They do not address nonlinearities or other effects on aileron actuation that electronic flight controls may cause. Because this type of system may affect flight loads, and therefore the structural capability of the airplanes, special conditions are needed to address these effects.

Discussion

These special conditions differ from current requirements in that they require that the roll maneuver is based on defined actuation of the cockpit roll control as opposed to defined deflections of the aileron itself. Also, the special conditions require an additional load condition at V_A , in which the cockpit roll control is returned to neutral following the initial roll input.

These special conditions differ from similar special conditions applied on previous programs. These special conditions are limited to the roll axis only, whereas previous special conditions also included the pitch and yaw axes. Special conditions are no longer needed for the pitch or yaw axes, because Amendment 25-91 takes into account the effects of an electronic flight-control system in those axes (§ 25.331 for pitch and § 25.351 for yaw). On the Model 737-8 series airplanes, only the flight spoilers are fly-by-wire.

These special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

Applicability

As discussed above, these special conditions are applicable to the Boeing Model 737-8 series airplanes. Should Boeing apply at a later date for a change to the type certificate to include another model incorporating the same novel or unusual design feature, these special conditions would apply to that model as well.

Conclusion

This action affects only certain novel or unusual design features on Boeing Model 737-8 series airplanes. It is not a rule of general applicability.

The substance of these special conditions has been subjected to the notice and comment period in several prior instances and has been derived without substantive change from those previously issued. It is unlikely that prior public comment would result in a significant change from the substance contained herein. Therefore, because a delay would significantly affect the certification of the airplane, the FAA has determined that prior public notice and comment are

unnecessary and impracticable, and good cause exists for adopting these special conditions upon publication in the **Federal Register**. The FAA is requesting comments to allow interested persons to submit views that may not have been submitted in response to the prior opportunities for comment described above.

List of Subjects in 14 CFR Part 25

Aircraft, Aviation safety, Reporting and recordkeeping requirements.

The authority citation for these special conditions is as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701, 44702, 44704.

The Special Conditions

Accordingly, pursuant to the authority delegated to me by the Administrator, the following special conditions are issued as part of the type certification basis for the Boeing Model 737-8 series airplanes.

Design Roll Maneuver Condition

In lieu of compliance to § 25.349(a):

The following conditions, speeds, and cockpit roll-control motions (except as the motions may be limited by pilot effort) must be considered in combination with an airplane load factor of zero and of two-thirds of the positive maneuvering factor used in design. In determining the resulting control-surface deflections, the torsional flexibility of the wing must be considered in accordance with § 25.301(b):

1. The applicant must investigate conditions corresponding to steady rolling velocities. In addition, conditions corresponding to maximum angular acceleration must be investigated for airplanes with engines or other weight concentrations outboard of the fuselage. For the

angular acceleration conditions, zero rolling velocity may be assumed in the absence of a rational time-history investigation of the maneuver.

2. At V_A , sudden movement of the cockpit roll control up to the limit is assumed. The position of the cockpit roll control must be maintained until a steady roll rate is achieved and then must be returned suddenly to the neutral position.
3. At V_C , the cockpit roll control must be moved suddenly and maintained so as to achieve a roll rate not less than that obtained in Special Condition 2, above.
4. At V_D , the cockpit roll control must be moved suddenly and maintained so as to achieve a roll rate not less than one third of that obtained in Special Condition 2, above.

Issued in Renton, Washington, on January 20, 2016.

/s/

Michael Kaszycki

Acting Manager, Transport Airplane Directorate

Aircraft

Certification

Service

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